



Coffee Break Training - Fire Protection Series

Inspection Techniques: Nonsparking Tools

No. FP-2013-15 April 9, 2013

Learning Objective: The student shall be able to list four examples of metals used in nonsparking tools.

There are numerous references in the model fire codes and standards that refer to the use of “nonsparking” tools in hazardous environments. These areas may include explosives and pyrotechnic manufacture and storage, flammable liquid or gas production or storage, power stations, pipelines, pharmaceutical production and plastic manufacturing. This list is not exhaustive.

Commonly used hand tools are often manufactured of steel alloys. They can cause ignition by friction, with impact on each other or on other materials such as steel or concrete, in which an ordinary mechanical or frictional spark is generated. They also can cause ignition by a chemically generated spark, caused by impact between certain metals and some oxygen-containing substances (such as rust, which is iron oxide).

“Nonsparking,” “spark reduced,” “spark-resistant” or “spark-proof” tools are names given to tools made of metals such as brass, bronze, Monel™ metal (copper-nickel alloy), copper-aluminum alloys (aluminum bronze) or copper-beryllium alloys (beryllium bronze).

Nonsparking tools also generate sparks sometimes referred to as “cold sparks.” These cold sparks have a low heat level and do not ignite carbon disulfide, which has the lowest known ignition point of any substance having an autoignition temperature of 194 F (90 C). Therefore while nonsparking tools may lower the risk of a spark, they do not eliminate the possibility of a spark. The name “nonsparking” is misleading because these tools are capable of producing a spark: the term “reduced-sparking tools” better describes these tools.

Preferred nonsparking metals have less tensile strength than steels usually used to make tools. A lower tensile strength means the metal has less strength or resistance to tearing apart when stretched under test conditions. It also means that these tools are softer, wear down more quickly than ordinary steel tools and have to be serviced more frequently. Do not use nonsparking hand tools in direct contact with acetylene, which may form explosive acetylides,¹ especially in the presence of moisture.

Nonmetals like wood, leather and plastic are suitable for some tools like shovels, scrapers or scoops and do not pose a friction spark hazard.

It is important to assess each situation carefully and use the appropriate tools for the hazards that are present. In some cases, nonsparking tools may still be able to produce a spark.

For recommendations and additional information, always contact the tool manufacturer and the producer of the hazardous materials, around which it will be used, to verify compatibility.



Nonsparking tools are used in work areas throughout this petrochemical refinery to minimize the risk of igniting hazardous vapors.

¹ Compounds arising by replacement of one or both hydrogen atoms of acetylene (ethyne) by a metal or other cationic group, e.g., $\text{NaC}\equiv\text{CH}$ monosodium acetylide. Some acetylides are notoriously explosive.

